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What is a Floodplain Forest?

I. Introduction

FLOODPLAIN FORESTS ARE UNIQUE NATURAL COMMUNITIES that occur on periodically flooded land along river corridors. They form a mosaic across the landscape and different types of floodplains can be identified by their particular ecological characteristics. The structural characteristics of forested floodplain environments and their position in the natural landscape provide valuable wildlife habitat for breeding birds, spring migratory birds, insect populations, amphibians that utilize vernal pools as part of their life cycle and other species. Some of these species are completely dependent on the diversity of forested floodplains for food and breeding and nesting habitat.

The United States Environmental Protection Agency has recognized the importance of floodplain forests in New Hampshire by funding a multi-year study of the flora and fauna of those areas. Information about the plant communities, and the birds, amphibians and insects that frequent forested floodplains was collected and analyzed by the Natural Heritage Inventory Program, the NH Fish & Game Department, the Audubon Society of NH, the NH Department of Environmental Services, and the University of New Hampshire. These research reports document the uniqueness of forested floodplains and their functional values as natural systems and as wildlife habitat.

This technical bulletin summarizes the information gathered by these studies so that local planners and conservation commissions can use it in developing a natural resources inventory as part of the municipal master plan. Forested floodplains are particularly important as wildlife habitat due to the diversity of cover types. They also provide a vegetative buffer that serves to protect shoreland and enhance water quality.

Historically, natural floodplain areas have been fragmented and impacted by agriculture, timber harvesting and other human activities associated with land development. The quality of these areas for wildlife habitat and flood control has often been diminished by human disturbance of the natural land.

For this reason it is important for local planning boards and conservation commissions to recognize the functional value of forested wetlands and to consider their importance when making local planning and land use decisions.

Communities can carry out a local survey of forested floodplain wetlands and include the data collected in a natural resources inventory in the municipal master plan. The information can be useful in local land protection or acquisition strategies as well. It can also be used by the planning board as justification for adopting forested floodplain protection requirements as part of their zoning ordinance and subdivision and site plan review regulations.

This technical bulletin will summarize the seven types of forested floodplain wetlands found in New Hampshire and discuss avian, amphibian and insect populations that benefit from their habitat. A sample data collection sheet that can be used to inventory these resources is included in Appendix I and a list of references that may be useful to local officials is found in Appendix II.

II. Plant Communities: Types of Floodplain Forests

There are seven major types of floodplain forest communities in New Hampshire associated with minor rivers, major streams and high floodplains and terraces of major rivers. These include:

1. balsam fir floodplain forests,
2. red maple floodplain forests,
3. basswood/white ash/black maple floodplain forests,
4. swamp white oak floodplain forests,
5. sycamore floodplain forests,
6. low hemlock/hardwood/cinnamon fern forests and
7. rich sugar maple/ash/oak/hickory forests.

The red maple and swamp white oak forested floodplains each have three distinctive types or variants based upon their topographic position relative to the river and variation in their associated plant communities. The low hemlock/hardwood/cinnamon fern and the rich sugar maple/ash/oak/hickory forests are generally higher in the landscape and are often transitional areas to upland forest communities.

- 1. BALSAM FIR FLOODPLAIN FORESTS** are found in northern and sometimes central New Hampshire where there are local cold climate conditions. They occur along major rivers in the mountains and minor rivers and major streams located elsewhere. Soil conditions are generally low in nutrients and the occurrence of flooding is less frequent than in other floodplain forest

types. Balsam fir usually makes up the dominant canopy, but this may be shared with red maple. Other associated species include black cherry, white pine and sometimes silver maple, hemlock or red spruce. Common understory species include blue joint, tussock sedge, gold thread, arrow-wood, sensitive and royal ferns, rough golden rod and tall meadow-rue.

2. RED MAPLE FLOODPLAIN FOREST community types have three variants:

The low red maple floodplain forest variant typically occurs at lower elevations and closer to rivers. The vegetative composition of these areas has a predominant canopy of red maple with some occurrences of white pine, shagbark hickory and red oak. If present in the low red maple variant, silver maples are usually found adjacent to the river channel. The understory consists of plants that are adapted to wetter sites, such as winterberry and highbush blueberry in the shrub layer and sensitive fern, royal fern, northern lady fern, cinnamon fern and interrupted fern in the herbaceous layer.

The low/medium red maple floodplain forest variant is similar to the low maple floodplain type in landscape position and proximity to the river channel. However, the low/medium type can also be found at higher elevations in the floodplain and at greater distances from the river. The predominant over story is red maple, interspersed with a higher occurrence of black cherry than either the low or higher red maple floodplain communities. Common species in the shrub layer include musclewood, nannyberry, northern arrow-wood and climbing poison ivy. Occurrences of tall flat topped white aster, intermediate wood fern, rough goldenrod, tall meadow-rue, jack in the pulpit, inflated sedge, drooping and common woodreed are more common in the low/medium variant than in the low red maple floodplain. Wetter vegetative species are less common than in the low floodplain variant and seasonal high water tables are not likely to be as high.

The medium/high red maple floodplain variant is similar to the mixed hardwood/conifer forests of the transitional or central hardwood region. Its terraces are higher above the river than either the low or low/medium red maple variants by up to 3 feet. This community type is also likely to be set back further from the river channel. Flooding occurs intermittently during peak floods of 5 to 100 year storm frequency. Red maple is common in the canopy, with some black cherry and American elm. The occurrence of two species distinguish this variant from the lower floodplain variants, red oak and white pine. Other common species to the medium/high red maple floodplain are highbush blueberry, early low blueberry, wintergreen, sheep laurel, sweet pepperbush, winterberry, witch hazel, witherod, musclewood, climbing poison ivy and silky dogwood.

3. BASSWOOD / WHITE ASH / BLACK MAPLE FLOODPLAIN FORESTS

occur on narrow floodplains along several streams draining into Great Bay in the coastal area. These forests are flooded during spring run-off periods and other peak floods. The mosaic of these landscapes include enriched sites, floodplains, and wetland habitats. Soils are generally silt loams and range from moderately well drained to poorly drained, with shallow or non-existent organic horizons. Basswood and white ash are the primary overstory dominants. Occasionally present in the canopy are black maple, silver maple, shagbark hickory, red maple and red oak. The understory consists of species common to other forested floodplain communities, such as musclewood, American Elm, silky dogwood, nannyberry, poison ivy, tall meadow rue, sensitive fern, lady fern, false nettle, jewelweed, water purslane, rough golden rod, white wood aster and wood nettle. A relatively neutral pH status of the soil is implicated by the vegetative species present. Due to the fragmentation and long term disturbance of New Hampshire's coastal landscape, many non-native and potentially invasive species exist.

4. **SWAMP WHITE OAK FLOODPLAIN FOREST** communities are relatively rare, both in New Hampshire and regionally. As with the red maple floodplain type, there are three variants.

The high and the low swamp white oak variants are distinguished by floristic differences associated with their topographic position in the floodplain. The third variant is determined based upon a greater occurrence of river birch. In addition to the swamp white oak, green ash is common in the low variant. Drooping sedge, common woodreed, marsh fern, nannyberry, silky dogwood, tussock sedge and blue flag iris are also present. Shagbark hickory is common in the high variant, along with white pine, red oak, ironwood, American beech, New York fern, wild lily of the valley and lowbush blueberry.

The river birch variant shares common dominant species with the swamp white oak low variant and basswood/white ash/black maple floodplain forest communities.

5. **SYCAMORE FLOODPLAIN FORESTS** are rare in New Hampshire. The only known occurrences of these communities are in the low floodplains of the Ashuelot River north of Surry Mountain Lake and the North River in Lee. Sycamore floodplain forests are located in flashy watersheds at the base of steep slopes, where the soils tend to be sandy loams, sand or gravelly sand, with cobbles in the river channel substrate. The community type exhibits a richness of vegetative species including sycamore, musclewood, red maple, sugar maple, American elm, bitternut hickory and butternut. In areas that are more frequently flooded, the woody shrub or sapling layer is absent. This floodplain community is often found as part of a mosaic in the landscape, interspersed with other types of floodplains. Medium to high elevations adjacent to forested sycamore floodplains characteristically exhibit a sugar maple/ironwood/short husk floodplain community type.

- 6. THE LOW HEMLOCK/HARDWOOD/CINNAMON FERN FOREST** type is characteristically found along stream drainages, high floodplains, inactive river channels and other upland-wetland ecotones. Canadian hemlock, red maple and white pine dominate the overstory along with a mixture of other wetland and upland species. These plant communities often represent transitional zones in the natural landscape. The relatively acidic soils may range from sandy loams to loamy sand tills and have the riverine characteristics of kame terrace soils. They have shallow water tables and tend to be moderately to somewhat poorly drained. While the overstory is similar to certain upland forests, the understory exhibits species such as cinnamon and interrupted fern, spicebush and mosses that indicate wetter conditions.
- 7. THE RICH SUGAR MAPLE/ASH/OAK/HICKORY FORESTED FLOODPLAIN** community type occurs primarily on warm southern or western exposures of steep lake-bed sediments and river terrace slopes of the lower Connecticut and Merrimack River valleys. This community probably supports a higher diversity of tree and other woody species than any other natural floodplain type in the state. These fertile, enriched forests exhibit a diverse suite of natural landscapes, including plant communities found in floodplains, upland forests, and swamps. The ground beetles, rests and seeps on slopes. Tree species include sugar maple, white and green ash, basswood, butternut, hemlock, hickory, round leaved dogwood and ironwood. The nutrient demanding understory includes wild ginger, ostrich fern, Dutchman's breeches and the rarer bladdernut, and Virginia water leaf. Other common species include sensitive fern, false Solomon's seal, Virginia creeper, witch hazel, speckled alder and jewel weed.

III. Migratory and breeding bird populations associated with Floodplain Forests

New Hampshire's floodplain forest communities are unique in that they support breeding bird populations that are distinct from those of the upland hardwood forests. Within forested floodplain communities, higher order, mainstem rivers support different breeding bird populations than those of their lower order tributaries. Downy and hairy woodpeckers, warbling vireos, American robins, gray catbirds, song sparrows, rose breasted grosbeaks and Baltimore orioles are generally associated with the mainstem forested floodplains. Eastern wood-pewee, brown creeper, chestnut-sided warbler, ovenbird and scarlet tanager are generally more abundant in the diverse forests of the tributary floodplains. Fragments of floodplain forests may support more of the migratory species.

Studies of small, spring migratory landbirds in New Hampshire have shown that relatively small, mature, closed canopy floodplain forests provide necessary stopover habitat for these species. It is common for these birds to utilize the abundant food, protective cover and natural diversity of forested floodplain areas as they pass

through on their journey to the areas where they breed and nest. Both major rivers and their tributaries provide such temporary habitat opportunities.

Larger patches of forested floodplains generally exhibit a greater species richness, floristically and support a greater diversity of breeding as opposed to migratory birds. In contrast, smaller floodplain fragments support fewer total species and numbers of breeding birds but provide valuable habitat for their migratory counterparts. This tendency supports the need to identify and protect diverse, forested floodplain habitat structures for a variety of vegetative and avian species.

IV. Amphibian populations associated with Floodplain Forests

Wetlands and vernal pools in forested floodplains provide useful habitat for a variety of amphibian species in their aquatic larval and terrestrial or semi terrestrial life stages. Such species as wood frogs, spring peepers, salamanders and newts are dependent upon these fragile habitats as breeding sites, as well as water sources during their adult lives. Abundance and richness of populations of these species are highly dependent upon the hydroperiod of the site, or the duration and time of year that water is present. Within the possible ranges of hydroperiods, temporary, fishless bodies of water that dry up for some period of the year are called vernal pools. The hydroperiod determines the type of amphibian breeding habitat provided by vernal pools. For example, vernal pools that dry up in summer are likely to support different species than those that dry up in the fall.

Short hydroperiod vernal pools dry up in May through July, and have little or no emergent or floating vegetation. Buttonbush and highbush blueberry are common shrubs in these pools. Intermediate hydroperiod wetlands dry up in late July to September, and exhibit similar shrub species. They may, however, have some floating or emergent vegetation such as water-lilies, three way sedges, rattlesnake grass and bladderwort. Long hydroperiod, or permanent wetlands, have more vegetative diversity and complexity. They characteristically have abundant woody debris and well developed floating plant assemblages. Bur-reed, coontail, pond weed, cat-tail, arrow-head, water shield and pickerel-weed are prevalent. The longer hydroperiod wetlands provide greater time available for metamorphosis of amphibians. However, they also offer a greater opportunity as habitat for predators of amphibian larvae

The presence or absence of amphibian species are important indicators of the effects of surrounding landscape changes on their breeding habitat.

Reduced richness and abundance of amphibian species have been found in wetland and vernal pool areas that are disturbed by agriculture and urbanized landscapes. Roads can create barriers to migration of amphibians. The location of vernal pools and wetlands relative to other wetlands also has a significant influence on the amphibian species composition. Isolated wetlands are more slowly colonized by amphibians than wetlands located near other wetlands. Over time, isolated populations of amphibians also lose genetic diversity.

Wood frog larvae, most dependent on isolated vernal pools as breeding sites, are most abundant in short **hydroperiod** wetlands. They occur, with less frequency in wetlands with intermediate hydroperiods. Spotted salamanders have a higher relative abundance in areas with both short and intermediate hydroperiods, while spring peeper and toad populations more commonly breed in the intermediate sites. Green frog and gray treefrog larvae tend to be found in the intermediate to long hydroperiod wetlands, while bull frogs choose more permanent sites.

Amphibian presence is also dependent on the nature of surrounding upland habitat. Most vernal pools are surrounded by red maple, white pine, eastern hemlock, black, yellow and gray birch, American elm, red and black oak, black cherry and shagbark hickory.

The location of a wetland or a vernal pool within a floodplain or upland does not have a significant impact on the presence of amphibian species. However, the land uses surrounding the wetlands have a major impact on their value as amphibian breeding habitat.

Roads and urbanized areas create barriers that prevent amphibian migration and alteration of adjacent natural communities lessens their importance as travel routes. Maintaining a vegetative buffer around vernal pool wetlands located in forested floodplain habitats would improve the probability of those areas being used as amphibian breeding habitat.

V. Insect populations associated with Forested Floodplains

In general, members of the ground beetle family Carabidae, are known to be associated with wetlands. There are a distinct suite of genera and species that are specific to floodplain forested wetlands. The presence or absence of these beetles and the diversity of species can be used as indicators of the impact of human disturbances on natural floodplain ecosystems.

Almost all of the carabids are nocturnal predators which search for their prey in areas that are often mature forested floodplains. Some species of carabids are known to be indicators of certain types of wetlands or of the quality of those wetlands as habitat for beetles. Human disturbance of the land in and around these floodplains is known to decrease species richness and abundance of carabid beetles.

The Baker River floodplain in Rumney, is an example of a red maple/black cherry floodplain forest with a fairly steep grade between the low and high variants. Critical areas that provide habitat for carabid species are located along the interface of either the river or oxbow lake margins. The similarity of carabid species is greater on the first and second terraces of forested floodplains. The beetles most common to these terraces include species such as *Carabus serratus* and *Chlaenius emarginatus*. More common in the older growth, mature forest floodplain types is *Schaphinotus viduus*, a snail feeding beetle with distinctively long mouth parts that are used to secrete an en-

zyme into its prey. *Nebria pallipes* is a species found in areas of fast moving waters that are typical of the Baker River floodplain.

Along the Merrimack River in Concord is an example of a silver maple forest on the banks of a large, older meandering river. It has wide sandy floodplains and high terraces. One distinctive, nocturnal carabid species that is indicative of this floodplain type, *Chlaenius sericeous*, has a metallic green back, orange legs and a black underside. *Agonum anchomenoides* beetles, another species common to silver maple floodplain forests, are active during the daytime.

The rare swamp white oak/river birch floodplain forest community is relatively flat with slow moving water. In addition to the carabid beetles that are common to all forested floodplains, this community is home to the rare *Carabis goryi* beetle. This beetle is only found in the Lower Exeter River basin. The uniqueness of this type of floodplain community and its associated beetles warrant their identification and further protection from the impacts of human disturbance.

VI. Land protection strategies

Identifying Forested Floodplains

The first step in protection of forested floodplain wetlands is to identify and map them for inclusion in the natural resources section of the municipal master plan. Most municipal master plans include soils maps that can be used as a starting point to generally locate floodplains that have been mapped as having alluvial soils. The procedure for doing this is outlined in detail in the NH Fish And Game Department's document entitled Identifying and Protecting New Hampshire's Significant Wildlife Habitat: A Guide for Towns and Conservation Groups, 2001. A sample field data sheet that can be used to inventory forested floodplain wetlands is included as Appendix I of this technical bulletin. It has a general list of the species of flora and fauna found in forested floodplains. Using these forms will help promote consistency in the data collected for each forested resource identified in the field. The completed forms can also be included as an appendix to the municipal master plan for the planning board to use in their land use decision making processes. Documentation of the sensitivity of forested floodplains in the municipality can be used in the evaluation of subdivision and site plan applications that come before the planning board on a regular basis.

Protection Strategies

Some of the protection strategies recommended in the previously mentioned publication are voluntary measures, such as management practices that can be implemented by landowners to enhance or improve the quality of forested floodplain wetlands as natural communities and wildlife habitat. This type of strategy can be encouraged through educational outreach to local citizens who own land in these sensitive areas. The purchase of land or development rights is sometimes possible, such that the property can be managed and protected by a municipality or a private land trust.

One concern from a management perspective in designing forested floodplain wetland mitigation projects is that the mitigation sites be located within the same watershed. They should also be located on rivers of the same order as the resource to be impacted if the goal is comparable breeding and migratory bird habitat. Also important to note is that protection of upland forests should not be considered appropriate to mitigate loss of floodplain forest habitat, as the species that utilize these two ecological types will differ.

Where purchase is not an option, the local zoning ordinance and subdivision and site plan review regulations can be designed to protect forested floodplain wetlands.

OSP's model Shoreland Protection Ordinance contains guidance for communities in developing an overlay zone to protect forested floodplains. Also available from OSP is a model that specifies recommended data requirement for soils and wetlands. These data requirements can be adopted as part of the local subdivision and site plan review regulations and required to be submitted to the planning board as part of completed applications for subdivision and site plan review. Information relative to the seven forested floodplain types described in this technical bulletin can be added to the data requirements for soils and wetlands.

OSP also has a number of technical bulletins that can be used as guidance in designing and implementing local land protection efforts. They are listed in Appendix II, the recommended reference list for this technical bulletin. It is also common for municipalities to use innovative land use controls such as environmental characteristics zoning to protect a natural vegetative buffer around surface waters and wetlands. The rationale for this type of regulation is described in the document entitled Buffers for Wetlands and Surface Waters, A Guidebook for New Hampshire Municipalities, Chase, Deming and Latawiec, Revised, May, 1997. The key is to recognize the importance of forested floodplain wetlands and the role that they play in the natural ecosystem.

Appendix I. Data Form – Type of Floodplain Forest

- ☐ I. Balsam fir
- ☐ II. Red maple
 - ☐ 1. Low
 - ☐ 2. Low/medium
 - ☐ 3. Medium/high
- ☐ III. Basswood/white ash/black maple
- ☐ IV. Swamp white oak
 - ☐ 1. High
 - ☐ 2. Low
 - ☐ 3. River birch
- ☐ V. Sycamore
- ☐ VI. Low hemlock/hardwood/cinnamon fern
- ☐ VII. Rich sugar maple/ash/oak/hickory

VEGETATION

- ☐ American beech (*Fagus grandifolia*)
- ☐ American elm *Ulmus americana*
- ☐ Arrow-wood *Viburnum dentatum*
- ☐ Balsam fir *Abies balsamea*
- ☐ Basswood *Tilia americana*
- ☐ Bitternut hickory *Carya cordiformis*
- ☐ Black cherry *Prunus serotina*
- ☐ Black maple *Acer nigrum*
- ☐ Blue flag iris *Iris versicolor*
- ☐ Blue joint *Calamagrostis canadensis*
- ☐ Bunch Berry *Cornus canadensis*
- ☐ Butternut *Juglans cinerea*
- ☐ Cinnamon fern *Osmunda cinnamomea*
- ☐ Common woodreed *Cinna arundinaceae*
- ☐ Drooping sedge *Carex carinita*
- ☐ Drooping woodreed *Cinna latifolia*
- ☐ Early low blueberry *Vaccinium angustifolium*
- ☐ Eastern hemlock *Tsuga canadensis*
- ☐ False nettle *Boehmeria cylindrica*
- ☐ Flat topped white aster *Aster umbellatus*
- ☐ Gold thread *Coptis trifolia*
- ☐ Green ash *Fraxinus pennsylvanica*
- ☐ Highbush blueberry *Vaccinium corymbosum*
- ☐ Intermediate wood fern *Dryopteris intermedia*
- ☐ Interrupted fern *Osmunda claytoniana*
- ☐ Ironwood *Ostrya virginiana*
- ☐ Jack in the pulpit *Arisaema triphyllum*
- ☐ Jewelweed *Impatiens capensis*
- ☐ Marsh fern *Thelypteris palustris*
- ☐ Meadowsweet *Spiraea alba*
- ☐ Musclewood *Carpinus caroliniana*
- ☐ Nannyberry *Viburnum lentago*
- ☐ New York fern *Thelypteris noveboracensis*
- ☐ Northern lady fern *Athyrium filix-femina*
- ☐ Ostrich fern *Matteuccia struthiopteris*
- ☐ Partridge berry *Mitchella repens*
- ☐ Red maple *Acer rubrum*
- ☐ Red oak *Quercus rubra*
- ☐ Red spruce *Picea rubens*
- ☐ River birch *Betula nigra*
- ☐ Rough golden rod *Solidago rugosa*
- ☐ Royal fern *Osmunda regalis*
- ☐ Sensitive fern *Onoclea sensibilis*
- ☐ Shagbark hickory *Carya ovata*
- ☐ Sheep laurel *Kalmia angustifolia*
- ☐ Silky dogwood *Cornus amomum*
- ☐ Silver maple *Acer saccharinum*
- ☐ Speckled alder *Alnus incana*
- ☐ Spicebush *Lindera benzoin*
- ☐ Swamp white oak *Quercus bicolor*
- ☐ Sweet pepperbush *Clethra alnifolia*
- ☐ Sycamore *Platanus occidentalis*
- ☐ Tall meadow-rue *Thalictrum pubescens*
- ☐ Tussock sedge *Carex stricta*
- ☐ Virginia creeper *Parthenocissus quinquefolia*
- ☐ White pine *Pinus strobus*

- ☐ White wood aster *Aster divaricatus*
- ☐ Wild ginger *Asarum canadense*
- ☐ Winterberry *Ilex verticillata*
- ☐ Witch hazel *Hamamelis virginiana*
- ☐ Witherod *Viburnum nudum* var. *cassinoides*
- ☐ Wood nettle *Laportea canadensis*

BIRDS

- ☐ American robin *Turdus migratorius*
- ☐ Baltimore oriole *Icterus galbula*
- ☐ Brown creeper *Certhia familiaris*
- ☐ Chestnut-sided warbler *Dendroica pensylvanica*
- ☐ Downy woodpecker *Dendrocopos pubescens*
- ☐ Eastern wood pewee *Contopus virens*
- ☐ Gray catbird *Dumetella carolinensis*
- ☐ Hairy woodpecker *Dendrocopos villosus*
- ☐ Ovenbird *Seiurus aurocapillus*
- ☐ Rose breasted grosbeak *Pheauticus ludovicianus*
- ☐ Scarlet tanager *Piranga ludovicana*
- ☐ Song Sparrow *Melospiza melodia*
- ☐ Warbling vireo *Vireo gilvus*

AMPHIBIANS

- ☐ American Toad *Bufo americanus*
- ☐ Bull frog *Rana catesbeiana*
- ☐ Eastern Newt *Notophthalmus viridescens*
- ☐ Gray tree frog *Hyla versicolor*
- ☐ Green frog *Rana clamitans*
- ☐ Pickerel frog *Rana palustris*
- ☐ Spotted salamander *Ambystoma maculatum*
- ☐ Spring peeper *Pseudacris crucifer*
- ☐ Wood frog *Rana sylvatica*

INSECTS

- ☐ *Agonum anchomenoides*
- ☐ *Agonum melanarium*
- ☐ *Carabus serratus*
- ☐ *Chlaenius emarginatus*
- ☐ *Chlaenius sericeus*
- ☐ *Diacaelus elongatus*
- ☐ *Diacaelus politus*
- ☐ Dragonfly larvae *Aeschna* spp & *Anax* spp.
- ☐ Giant water bug *Lethocerus americanus*
- ☐ Goryi beetle *Carabus goryi*
- ☐ *Nebria pallipes*
- ☐ *Oodes brevis*
- ☐ *Scaphinotus viduus*
- ☐ Water bug *Belostoma* spp.
- ☐ Water scorpions *Ranatra*

Appendix II: References

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